CHAPTER - V

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STRUCTURE OF REVENUE

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CHAPTER - V

STRUCTURE OF REVENUE

5.1:1 Introduction :

In chapter No.4, we have explained the structure of fixed cost as well as variable cost. Here we have tried to explain the meaning of total rvenue, average revenue as well as the structure and composition of total revenue obtainable from the biogas plants of different capacities. Lastly, we have calculated the total and average revenue according to the capacity of biogas plant.

5.1:2 Meaning of total revenue and average revenue :

Total revenue means the total gross receipts of the firm. It equals price multiplied by the amount sold. It is equal to the price multiplied by the total units of production.[1]

Total revenue = Total units of production X price of one unit.

Average revenue means the average gross recepts per unit of product.[2]

$$\text{Average revenue} = \frac{\text{Total revenue}}{\text{Total units of production.}}$$

5.1:3 Total revenue and Average revenue which is obtainable from the biogas plants :

The biogas which is used for cooking and lighting purpose and manure which increases the crop yield are the main components of the revenue obtainable from the biogas plants. It is equal to total value of gas and total value of manure. The gas is used for cooking, lighting and to run engines also. The manure is used to increase the fertility of land so as to increase the crop yield.

Total revenue = Total value of gas + Total value of manure.

We have calculated the total revenue and average revenue obtainable from biogas plants for the period of one year.

5.1:4 Production of biogas and valuation :

Here, we are going to compare the produced gas with the cost of Kerosene. Here we wish to know, if there is not availability of gas, how much cost will have to borne by the farmer for kerosene for use of his family for cooking purpose. It is clear that instead of spending on kerosene, family can cook their meals by using the biogas. It means they save the amount of kerosene by using biogas. In other words the particular amount can be the source of revenue by the biogas plants.

The value of gas which is calculated in terms of kerosene. The gas produced is converted into kerosene equivalent using the

the conversion factors worked out by us. We have taken a sample survey of 6 families who are using kerosene for cooking and water heating purpose. We found out that one person requires kerosene of Rs. 230/- per year. We have calculated the average of family members whose food is cooked on biogas according to the different types of plants and capacities.

One person requires kerosene of Rs. 230/- per year. Using this conversion factor, we have calculated the total and average revenue obtainable from biogas for the period of one year. It is shown in table No. 5.1:1.

5.1:5 Production and value of manure :

The biogas plants produce high quality of organic manure which increases the crop yield by 10 to 25 % more than farm yard manure. The slurry that comes out through outlet of biogas plant gives good quality of manure, twice or thrice in year. The value of manure is calculated at the current prices of farm yard manure in Arag village during the year 1987-88. The price of manure is Rs. 60/- per cart load or Rs. 500/- per lorry.

By taking into account these prices of manure, we have calculated the total and average receipts of manure which are shown in table No. 5.1:1.

Table No. 5.1:1

TOTAL AND AVERAGE REVENUE OBTAINABLE FORM BIOGAS AND MANURE ACCORDING TO THE CAPACITY OF BIOGAS PLANTS :

Capacity of plants	Type of plants	Total receipts of gas (Rs) (A)	Average receipts of gas (Rs) (C)	Total receipts of manure (Rs) (B)	Average receipts of manure (Rs) (D)	Total of A + B (Rs)	Total of C +D (Rs)
2 cu.m.	Janata N=6	4714.32	785.72	7127.00	1187.83	11841.32	1973.55
	Shivasadan N=1	460.00	460.00	1000.00	1000.00	1460.00	1460.00
3 cu.m.	Janata N=26	35030.90	1347.34	48348.00	1859.53	83378.90	3206.87
	Dinbandhu	7360.00	1840.00	7500.00	1875.00	14860.00	3715.00
4 cu.m.	Janata N=13	20276.48	1559.72	32692.80	2514.83	52969.27	4074.55
	Dinbandhu N=2	2300.00	1150.00	4000.00	2000.00	6300.00	3150.00
	K.V.I.C.	1600.00	1600.00	3000.00	3000.00	4600.00	4600.00
6 cu.m.	Janata	10752.00	2688.00	14300.00	3575.00	25052.00	6263.00

(N = Number of biogas plants which are in operation)

1) The total and average revenue of Janata model biogas plants of capacity 2 cu.m. is Rs. 11841.32 and Rs. 1973.55 respectively. The average revenue obtainabe from gas and manure is low because the plant holders feed the plant less than its capacity.

2) The total and average revenue of one Shivasadan model plant of capacity 2 cu.m. is Rs. 1460.00 and Rs. 1460. It is very low because the plant holdrs do not feed the plant daily. So the quantity of gas and manure is very low.

3) The total and average revenue of 26 Janata model plants of capacity 3 cu.m. is Rs. 83378.90 and Rs. 3206.87 respectively. There are 4 Dinbandhu plants of capacity 3 cu.m. whose total and average revenue is Rs. 14860 and Rs. 3715.00 respectively.

4) The total and average revenue of 13 Janata biogas plants of capacity 4 cu.m. is Rs. 52969.27 and Rs. 4075.55 respectively. There are only 2 Dinbandhu plants of 4 cu.m. capacity whose total and average revenue is Rs. 6300 and Rs. 3150.00 respectively. And there is only one plant of KVIC model of capacity 4 cu.m. The total and average revenue is Rs. 4600.00.

5) The total and average revenue of 4 Janata model biogas plants of capacty 6 cu.m. is Rs. 25052 and Rs. 6263.00 respectively.

It is high as compared to other plants because of average livestock is more than other plant holders, so it is obvious that the quantity of gas and manure is comparatively more than other plants.

5.2 IDENTIFICATION OF OPTIMUM UNIT :

5.2:1 INTRODUCTION :

This chapter relates with the identification of the optimum unit of biogas plant. The main purpose of our study is to find out the optimum size of the biogas plants of different models which are in operation in village Arag. When we try to find out the optimum unit, our concept is that the model should be economical. It means the average cost should be minimum and the average revenue should be maximum. The concept of benefit cost ratio is used for this purpose. We have calculated the benefit-cost ratio of different types and capacities of biogas plants in Arag village. It should be noted that the biogas plants which are in operation are only taken into consideration for finding out the optimum unit of biogas plant in Arag village. The study emphasises this identification of optimum unit so that the agriculturist or the owner of biogas plant should be able to know which of the model, and capacity is beneficial and most economical. Of course there are certain limilations to this study. It is so because we have

calculated all the information which relates to the village Arag. Secondly the biogas plants which are in operation are taken into consideration. Thirdly the models which are available in the village Arag are considered for finding out the optimum unit.

Again there can be differencess of opinion about the calculation of the average costs and average revenues, because we have collected all the information with the interviews with the biogas plant holders. Taking into consideration all these aspects, we have tried to calculate the benefit-cost ratios and tried to find out the optimum unit.

5.2:2 What is an Optimum Size or Unit ?

At a certain size the cost of production of a firm per unit of output will be at a minimum. At that size there will be no motive for further expansion, for at any other size, either smaller or larger, it would be less efficient. Such a firm is known as the optimum firm.[4]

So as to make it easy to idendify the optimum unit, we have worked out the benefit cost ratio of biogas plants of different capacities, and different models. By dividing the annual returns by annual costs we get benefit cost ratio. Less annual cost and more annual returns gives high benefit cost ratio. The biogas plant which has high benefit cost ratio, is the best or most efficient size of plant.

5.2:3 Annual Cost, Annual Returns and Benefit Cost Ratio Of Biogas Plants Of Different Capacities And Different Models :

Annual cost means interest on fixed cost, depreciation cost and maintenance cost of biogas plants. Annual returns means value of gas and manure produced by biogas plant in a period of one year. This is presented in table No. 5.2:1. Benefit-cost ratio means the relationship annual returns and annual costs or it is ratio of annual returns to annual costs.

Table No.5.2:1

ANNUAL COST, ANNUAL RETURNS AND BENEFIT COST RATIO OF BIOGAS PLANTS OF DIFFERENT CAPACITIES AND DIFFERENT MODELS :

Size or capacity of plants and models.	Total Annual cost per plant. (Rs)	Total Annual Returns per plant. From gas (Rs)	From Manure (Rs)	Gross Returns per plant (Rs)	Net Returns (Rs)	Benefit Cost Ratio.
Janata Model 2 Cu.m. N=6	1705.14	785.72	1187.83	1973.55	268.41	1.15
Shivsadan(KVIC) 2 Cu.m. N=1	1368.37	460.00	1000.00	1460.00	91.63	1.06
Janata Model 3 Cu.m. N=26	2262.29	1347.34	1859.53	3206.87	944.58	1.41
Dinbandhu 3 Cu.m. N=4	1806.99	1840.00	1875.00	3715.00	1908.01	2.05
Janata Model 4 Cu.m. N=13	**2416.65**	**1559.72**	**2514.83**	**4074.54**	**1657.89**	**1.68**
KVIC Model **4 Cu.m.** N=1	2709.87	**1600.00**	3000.00	4600.00	1890.13	**1.69**
Dinbandhu Model 4 Cu.m. N=2	1717.49	1150.00	2000.00	3150.00	1432.51	1.83
Janata Model 6 Cu.m. N=4	3155.92	2688.00	3575.00	6263.00	3107.08	1.98

(11 = Number of biogas plants which are in operation.)

1) The average annual cost and average annual gross returns of biogas plants of Janata model of capacity 2 Cu.m. are Rs. 1705.14 and Rs. 1973.55 respectively. The net return is Rs. 268.41 and benefit cost ratio is 1.15. The average annual cost and the average annual returns of Shivsadan Model are Rs. 1368.37 and Rs. 1460.00 respectively. The benefit cost ratio of Shivasadan model is 1.06.

2) The average annual cost and average annual gross returns of biogas plants of Janata Model of capacity 3 Cu.m. are Rs. 2262.29 and Rs. 3206.87 respectively. The benefit cost ratio is 1.41.

The average annual cost and average annual gross returns of Dinbandhu Model of capacity 3 Cu.m. are Rs. 1806.99 and Rs. 3715.00 respectively. The benefit cost ratio is 2.05 which is relatively more than other types of plants of different capacities.

3) The average annual cost and average annual gross returns of Janata model of capacity 4 Cu.m. are Rs. 2416.65 and Rs. 4074.54 respectively. The benefit-cost ratio is 1.68. The annual average cost and annual average returns of KVIC model are Rs. 2709.87 and Rs. 4600.00 respectively. The benefit cost ratio is 1.69.

The average annual cost and average annual returns of Dinbndhu model of 4 Cu.m. capacity are Rs. 1717.49 and Rs.3150.00 respectively. The benefit cost ratio is 1.83 which is highest in 4 Cu.m. capacity plants.

4) The average annual cost and average annual returns of Janata model of 6 Cu.m. capacity plant are Rs. 3155.52 and Rs. 6263.00 respectively. The benefit-cost ratio is 1.98.

From the above explaination, we found that the biogas plants of Dinbandhu model of 3 Cu.m. capacity are more profitable than other models of biogas plants in Arag village whose benefit cost-ratio is 2.05. The biogas plant of capacity 6 Cu.m. of Janata model is also more economicalor profitable. Whose benefit cost ratio is 1.98. The biogas plants of 4 Cu.m. capacity of Dinbandhu model are also profitable whose benefit cost ratio is 1.83.

Generally we conclude that the biogas plants of Dinbandhu model are more ecnomical or profitable because at lowest annual cost give more return. Then biogas plants of Janata model of 6 Cu.m. is also profitable one.

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